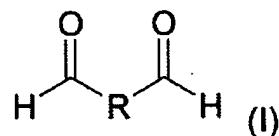


**WHAT IS CLAIMED IS:**

1. A composition for dyeing keratin fibers, comprising, in a suitable dyeing medium:

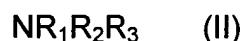
a) at least one polyaldehyde heterocyclic compound of formula (I) comprising at least two aldehyde functional groups in  $\alpha$ ,  $\beta$  or  $\gamma$  positions on the at least one polyaldehyde heterocyclic compound, or a corresponding addition salt thereof :



wherein R is chosen from a 5- to 30-membered aromatic or non-aromatic, fused or non-fused, unsaturated divalent monoheterocyclic or polyheterocyclic group comprising at least one hetero atom chosen from nitrogen, sulphur, oxygen and phosphorus,

these heterocyclic groups optionally being substituted with at least one group chosen from halo, C<sub>1</sub>-C<sub>4</sub> alkyl, hydroxyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, amino, C<sub>1</sub>-C<sub>4</sub> monoalkylamino or di(C<sub>1</sub>-C<sub>4</sub>)alkylamino, C<sub>1</sub>-C<sub>4</sub> alkylcarbonyl, hydrogenocarbonyl, C<sub>1</sub>-C<sub>4</sub> alkoxy carbonyl, nitro, sulphonato, ammonio, tri(C<sub>1</sub>-C<sub>4</sub>)alkylammonio, imidazolio, pyridinio and benzothiazolio groups;

b) at least one nitrogen compound of formula (II) or a corresponding addition salt thereof :



wherein R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>, independently of each other, are chosen from:

- a hydrogen atom;
- a hydroxyl group;

- a C<sub>1</sub>-C<sub>4</sub> alkoxy group;
- a branched or unbranched C<sub>1-30</sub> aliphatic chain, which may comprise at least one bond chosen from double and triple bonds, optionally substituted with at least one group chosen from hydroxyl, amino and halo groups;
- a fused or non-fused monoaromatic or polyaromatic group comprising from 6 to 50 carbon atoms; and
- a 5- to 30-membered aromatic or non-aromatic, fused or non-fused, monoheterocyclic or polyheterocyclic group comprising at least one hetero atom chosen from nitrogen, sulphur, oxygen and phosphorus; these heterocyclic groups optionally being substituted with at least one group chosen from halo, C<sub>1</sub>-C<sub>4</sub> alkyl, hydroxyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, amino, C<sub>1</sub>-C<sub>4</sub> monoalkylamino or di(C<sub>1</sub>-C<sub>4</sub>)alkylamino, C<sub>1</sub>-C<sub>4</sub> alkylcarbonyl, hydrogenocarbonyl, carboxyl, nitro and sulphonato groups.

2. A composition according to claim 1, wherein the polyaldehyde heterocyclic compound of formula (I) is a dialdehyde.

3. A composition according to claim 1, in which the polyaldehyde heterocyclic compound of formula (I) is non-fused.

4. A composition according to claim 3, wherein the polyaldehyde heterocyclic compound of formula (I) is chosen from thiophenedicarboxaldehydes and derivatives thereof, pyridinedicarboxaldehydes and derivatives thereof, pyrroledicarboxaldehydes and derivatives thereof, and furandicarboxaldehydes and derivatives thereof.

5. A composition according to claim 4, wherein the polyaldehyde heterocyclic compound of formula (I) is chosen from 2,3-thiophenedicarboxaldehyde, 2,6-pyridinedicarboxaldehyde, 3,4-dimethyl-2,5-pyrroledicarboxaldehyde, 2,5-

thiophenedicarboxaldehyde and 2,5-diformyl-3,4-furandicarboxaldehyde.

6. A composition according to claim 3, wherein the polyaldehyde heterocyclic compound of formula (I) is a 5-membered heterocyclic compound.

7. A composition according to claim 6, in which the polyaldehyde heterocyclic compound of formula (I) is chosen from 2,3-thiophenedicarboxaldehyde, 3,4-dimethyl-2,5-pyrroledicarboxaldehyde and 2,5-thiophenedicarboxaldehyde.

8. A composition according to claim 1, wherein when at least one of the radicals  $R_1$ ,  $R_2$  or  $R_3$  of formula (II) is chosen from a fused or non-fused, monoaromatic or polyaromatic group comprising from 6 to 50 carbon atoms, the aromatic group is unsubstituted or substituted with at least one group chosen from halo,  $C_1$ - $C_4$  alkyl, hydroxyl,  $C_1$ - $C_4$  alkoxy,  $C_1$ - $C_4$  alkylthio, amino,  $C_1$ - $C_4$  monoalkylamino or di( $C_1$ - $C_4$ )alkylamino,  $C_1$ - $C_4$  alkylcarbonyl, hydrogenocarbonyl, carboxyl, nitro and sulphonato groups.

9. A composition according to claim 1, wherein the at least one nitrogen compound of formula (II) is chosen from monoalkanolamines, dialkanolamines, trialkanolamines, alkylalkanolamines, dialkylalkanolamines, alkyldialkanolamines, aromatic amines and diamines and aqueous ammonia.

10. A composition according to claim 9, wherein the at least one nitrogen compound of formula (II) is chosen from  $C_1$ - $C_3$  monoalkanolamines, di( $C_1$ - $C_3$ )alkanolamines, tri( $C_1$ - $C_3$ )alkanolamines, ( $C_1$ - $C_4$  alkyl)( $C_1$ - $C_3$  alkanol)amines, (di( $C_1$ - $C_4$ )alkyl)( $C_1$ - $C_3$  alkanol)amines and ( $C_1$ - $C_4$  alkyl)(di( $C_1$ - $C_3$ )alkanol)amines.

11. A composition according to claim 10, wherein the at least one nitrogen compound of formula (II) is chosen from monoethanolamine, triethanolamine, 2-methyl-1-propanol and monoisopropanolamine.

12. A composition according to claim 9, wherein the at least one nitrogen

compound of formula (II) is chosen from aromatic amines and diamines.

13. A composition according to claim 12, wherein the at least one nitrogen compound of formula (II) is a para-phenylenediamine derivative.

14. A composition according to claim 13, wherein the at least one nitrogen compound of formula (II) is chosen from para-phenylenediamine, para-toluenediamine, 2-chloro-para-phenylenediamine, 2,3-dimethyl-para-phenylenediamine, 2,6-dimethyl-para-phenylenediamine, 2,6-diethyl-para-phenylenediamine, 2,5-dimethyl-para-phenylenediamine, N,N-dimethyl-para-phenylenediamine, N,N-diethyl-para-phenylenediamine, N,N-dipropyl-para-phenylenediamine, 4-amino-N,N-diethyl-3-methylaniline, N,N-bis( $\beta$ -hydroxyethyl)-para-phenylenediamine, 4-N,N-bis( $\beta$ -hydroxyethyl)amino-2-methylaniline, 4-N,N-bis( $\beta$ -hydroxyethyl)amino-2-chloroaniline, 2- $\beta$ -hydroxyethyl-para-phenylenediamine, 2-fluoro-para-phenylenediamine, 2-isopropyl-para-phenylenediamine, N-( $\beta$ -hydroxypropyl)-para-phenylenediamine, 2-hydroxymethyl-para-phenylenediamine, N,N-dimethyl-3-methyl-para-phenylenediamine, N-ethyl-N-( $\beta$ -hydroxyethyl)-para-phenylenediamine, N-( $\beta$ , $\gamma$ -dihydroxypropyl)-para-phenylenediamine, N-(4'-aminophenyl)-para-phenylenediamine, N-phenyl-para-phenylenediamine, 2- $\beta$ -hydroxyethoxy-para-phenylenediamine, 2- $\beta$ -acetylaminooethoxy-para-phenylenediamine, N-( $\beta$ -methoxyethyl)-para-phenylenediamine, 4-aminophenylpyrrolidine, 2-thienyl-para-phenylenediamine, 2- $\beta$ -hydroxyethylamino-5-aminotoluene and 3-hydroxy-1-(4'-aminophenyl)pyrrolidine, and the acid-addition salts thereof.

15. A composition according to Claim 14, wherein the at least one nitrogen compound of formula (II) is chosen from para-phenylenediamine, para-toluenediamine, 2-isopropyl-para-phenylenediamine, 2- $\beta$ -hydroxyethyl-para-phenylenediamine, 2- $\beta$ -hydroxyethoxy-para-phenylenediamine, 2,6-dimethyl-para-phenylenediamine, 2,6-diethyl-

para-phenylenediamine, 2,3-dimethyl-para-phenylenediamine, N,N-bis( $\beta$ -hydroxyethyl)-para-phenylenediamine, 2-chloro-para-phenylenediamine, and 2- $\beta$ -acetylaminoethoxy-para-phenylenediamine, and the acid-addition salts thereof.

16. A composition according to claim 9, wherein the at least one nitrogen compound of formula (II) is aqueous ammonia.

17. A composition according to claim 1, wherein the at least one polyaldehyde heterocyclic compound of formula (I) is present in an amount ranging from 0.01% to 30% by weight relative to the total weight of the composition.

18. A composition according to claim 17, wherein the at least one polyaldehyde heterocyclic compound of formula (I) is present in an amount ranging from 0.05% to 20% by weight, relative to the total weight of the composition.

19. A composition according to claim 1, wherein the at least one nitrogen compound of formula (II) is present in an amount ranging from 0.01% to 30% by weight relative to the total weight of the composition.

20. A composition according to claim 19, wherein the at least one nitrogen compound of formula (II) may be present in an amount ranging from 0.05% to 20% by weight, relative to the total weight of the composition.

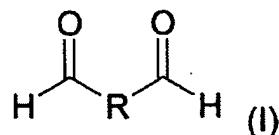
21. A composition according to claim 1, wherein said composition has a pH ranging from 4 to 11.

22. A composition according to claim 21, wherein said composition has a pH ranging from 5 to 10.

23. A process for dyeing keratin fibers, comprising applying to at least one keratin fiber:

a composition (A) comprising, in a cosmetic medium suitable for dyeing keratin

fibers, at least one polyaldehyde heterocyclic compound of formula (I) comprising at least two aldehyde functional groups in  $\alpha$ ,  $\beta$  or  $\gamma$  positions on the at least one polyaldehyde heterocyclic compound, or a corresponding addition salt thereof :



wherein R is chosen from a 5- to 30-membered aromatic or non-aromatic, fused or non-fused, unsaturated divalent monoheterocyclic or polyheterocyclic group comprising at least one hetero atom chosen from nitrogen, sulphur, oxygen and phosphorus,

these heterocyclic groups optionally being substituted with at least one group chosen from halo, C<sub>1</sub>-C<sub>4</sub> alkyl, hydroxyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, amino, C<sub>1</sub>-C<sub>4</sub> monoalkylamino or di(C<sub>1</sub>-C<sub>4</sub>)alkylamino, C<sub>1</sub>-C<sub>4</sub> alkylcarbonyl, hydrogenocarbonyl, C<sub>1</sub>-C<sub>4</sub> alkoxy carbonyl, nitro, sulphonato, ammonio, tri(C<sub>1</sub>-C<sub>4</sub>)alkylammonio, imidazolio, pyridinio and benzothiazolio groups; and a composition (B) comprising, in a cosmetic medium suitable for dyeing the hair, at least one nitrogen compound of formula (II) or a corresponding addition salt thereof :



wherein R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>, independently of each other, are chosen from:

- a hydrogen atom;
- a hydroxyl group;
- a C<sub>1</sub>-C<sub>4</sub> alkoxy group;
- a branched or unbranched C<sub>1-30</sub> aliphatic chain, which may comprise at least one bond chosen from double and triple bonds, optionally substituted

with at least one group chosen from hydroxyl, amino and halo groups;

- a fused or non-fused monoaromatic or polyaromatic group comprising from 6 to 50 carbon atoms; and

- a 5- to 30-membered aromatic or non-aromatic, fused or non-fused, monoheterocyclic or polyheterocyclic group comprising at least one hetero atom chosen from nitrogen, sulphur, oxygen and phosphorus;

these heterocyclic groups optionally being substituted with at least one group chosen from halo, C<sub>1</sub>-C<sub>4</sub> alkyl, hydroxyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, amino, C<sub>1</sub>-C<sub>4</sub> monoalkylamino or di(C<sub>1</sub>-C<sub>4</sub>)alkylamino, C<sub>1</sub>-C<sub>4</sub> alkylcarbonyl, hydrogenocarbonyl, carboxyl, nitro and sulphonato groups.

wherein said composition (A) and said composition (B) are applied separately or after mixing together, to the keratin fibers for a leave-in time sufficient to obtain a desired coloration.

24. A process according to claim 23, comprising mixing compositions (A) and (B) together just before use and applying the mixture thus obtained to the keratin fibers for a leave-in time sufficient to obtain a desired coloration.

25. A process according to claim 23, comprising successively applying compositions (A) and (B) to the keratin fibers for a leave-in time sufficient to obtain a desired coloration, wherein compositions (A) and (B) may be applied in any order.

26. A process according to claim 23, wherein said leave-in time for each of the compositions (A) or (B) or for their mixture ranges from 5 minutes to 1 hour.

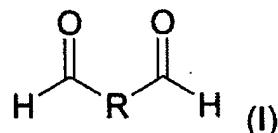
27. A process according to claim 26, wherein said leave-in time ranges from 5 minutes to 30 minutes

28. A process according to claim 25, further comprising rinsing the keratin fibers

between the application of composition (A) and the application of composition (B).

29. A multi-compartment device, comprising:

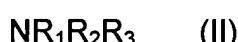
at least one first compartment comprising a composition comprising at least one polyaldehyde heterocyclic compound of formula (I) or an addition salt thereof comprising at least two aldehyde functional groups in  $\alpha$ ,  $\beta$  or  $\gamma$  positions on the at least one polyaldehyde heterocyclic compound:



wherein R is chosen from a 5- to 30-membered aromatic or non-aromatic, fused or non-fused, unsaturated divalent monoheterocyclic or polyheterocyclic group comprising at least one hetero atom chosen from nitrogen, sulphur, oxygen and phosphorus,

these heterocyclic groups optionally being substituted with at least one group chosen from halo, C<sub>1</sub>-C<sub>4</sub> alkyl, hydroxyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, amino, C<sub>1</sub>-C<sub>4</sub> monoalkylamino, di(C<sub>1</sub>-C<sub>4</sub>)alkylamino, C<sub>1</sub>-C<sub>4</sub> alkylcarbonyl, hydrogenocarbonyl, C<sub>1</sub>-C<sub>4</sub> alkoxycarbonyl, nitro, sulphonato, ammonio, tri(C<sub>1</sub>-C<sub>4</sub>)alkylammonio, imidazolio, pyridonio and benzothiazolio groups; and

at least one second compartment comprising a composition comprising at least one nitrogen compound of formula (II) or a corresponding addition salt thereof :



wherein R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>, independently of each other, are chosen from:

- a hydrogen atom;

- a hydroxyl group;

- a C<sub>1</sub>-C<sub>4</sub> alkoxy group;

- a branched or unbranched C<sub>1-30</sub> aliphatic chain, which may comprise at least one bond chosen from double and triple bonds, optionally substituted with at least one group chosen from hydroxyl, amino and halo groups;

- a fused or non-fused monoaromatic or polyaromatic group comprising from 6 to 50 carbon atoms; and

- a 5- to 30-membered aromatic or non-aromatic, fused or non-fused, monoheterocyclic or polyheterocyclic group comprising at least one hetero atom chosen from nitrogen, sulphur, oxygen and phosphorus;

these heterocyclic groups optionally being substituted with at least one group chosen from halo, C<sub>1</sub>-C<sub>4</sub> alkyl, hydroxyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, amino, C<sub>1</sub>-C<sub>4</sub> monoalkylamino or di(C<sub>1</sub>-C<sub>4</sub>)alkylamino, C<sub>1</sub>-C<sub>4</sub> alkylcarbonyl, hydrogenocarbonyl, carboxyl, nitro and sulphonato groups.